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LISTS OF SPECIES

Angiosperms from the Araripe National Forest, Ceará, Brazil

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ABSTRACT: This study provides a species list of the angiosperms from the Araripe National Forest (ANF) in the south part of Ceará state, northeastern Brazil. The floristic survey recorded 188 species from 55 Angiosperm families. The most species-rich families were Fabaceae (31), Rubiaceae (17), Asteraceae (14), Bignoniaceae (10), Myrtaceae (9), Euphorbiaceae (7), Apocynaceae and Malpighiaceae (7) and Annonaceae and Solanaceae (5). The flora of the ANF is composed of typical species from the vegetation physiognomies of Cerrado sensu lato such as cerradão and cerrado sensu stricto and it is influenced by the northeastern phytogeographic Cerrado province. Furthermore, there are influences of ecotones between these physiognomies, seasonal forests and carrascos within the Caatinga biome. In addition to four threatened species that were recorded, the ANF also harbors species that represent important incomes for local communities because of the non-timber forest products, such as *Dimorphandra gardneriana* Tul. and *Caryocar coriaceum* Wittm..

INTRODUCTION

The *cerrado* (a Neotropical savanna) in northeastern Brazil occurs in areas with altitudes up to 500 m in the states of Piauí and Maranhão (Castro and Martins 1999; Castro *et al*. 2007), on coastlines of the *Barreiras* Formation (coastal plains) in the states of Pernambuco, Paraíba and Ceará (Fernandes 1990; Oliveira-Filho and Carvalho 1993; Moro *et al*. 2011) and in isolated patches (enclaves) within the *Caatinga* biome in altitudes higher than 800 m (Costa *et al*. 2004; Costa and Araújo 2007).

The *cerrado* in northeastern Brazil is also considered peripheral or marginal since it is located at the extreme of the distribution area of the biome (Castro 1994). These areas are physiognomically and structurally an extension of the *cerrados* of the Central Plateau of Brazil (Castro 1996; Castro *et al.* 2007). Castro and Martins (1999) pointed out that there are two climatic barriers that cut across the region of *cerrados* between its southern limits and the Central Plateau and between these *cerrados* and those occurring in Brazilian northeastern: the occurrence of frost in the Cerrados of southeastern Brazil and the severe droughts in the northeastern Brazil

The flora of the Araripe National Forest (ANF) comprises species typical from the phytogeographical of the *Cerrado* domain such as *cerradão* and *cerrado sensu stricto* and it is influenced by the north-northeastern phytogeographic *Cerrado* province (Ratter *et al*. 2003). This province comprises areas of *cerrados* in the states of Ceará, Piauí, southern Maranhão, western Tocantins and eastern Bahia (Ratter *et al*. 2003).

The ANF is a protected area for sustainable use that was established in 1960 in the state of Ceará (IBAMA 2004). It is located on the Araripe Plateau and is among the 82 priority areas for biodiversity conservation in the *Caatinga* biome and among the 27 areas of high biological importance with priorities for biological surveys (Silva *et al*. 2004).

The first records on the flora of the Araripe Plateau were carried out by the British naturalist George Gardner in 1838 (Gardner 1975). Gardner collected a number of plant species in this region and some were described by him, such as *Allamanda violacea* Gardner and *Mouriri pusa* Gardner (Gardner 1975). Recently, there have been other scientific surveys of the flora of the ANF and Araripe Plateau (Ratter *et al*. 2003; Costa *et al*. 2004; Costa and Araújo 2007; Alencar *et al*. 2007). However, there are still many gaps in biotic information, and this has made it more difficult to implement some management and conservation actions in the ANF. The aim of this study was to provide a species list of the Angiosperm flora of the ANF in order to extend information on the local flora and on the protected areas within the northeastern Brazil.

MATERIALS AND METHODS

Study Site

The Araripe National Forest (ANF) is located on the Araripe Plateau (*Chapada do Araripe*), in the southern tip of the state of Ceará in northeastern Brazil, covering a total area of 38.626 ha. This protected area cross the municipalities of Santana do Cariri, Crato, Jardim and Barbalha and extends from latitudes 07°11'42" to 07°28'38" S and longitudes 39°13'28" to 39°36'33" W (Figure 1).

The ANF is under the influence of wet and hot tropical climate with a rainy season from January to May. The mean annual temperature is 24° a 26°C and the mean annual rainfall is 1090.9 mm (IPECE 2012).

The vegetation of the ANF comprises some of the physiognomies found in the *Cerrado* domain such as the *cerrado sensu stricto* (07°23'50.22" S, 39°20'40.44" W) and

the *cerradão* (07°23'58.74" S, 39°20'0.18" W) (Ribeiro and Walter 2008). Furthermore, there are also the *carrasco* (07°12' 43" S, 39°36' 23" W) and the semideciduous seasonal forests (07°16'31.8" S, 39°27'12.8" W) (Figures 2 and 3). In ANF the *carrasco* is associated with patches of dystrophic latosols and hydromorphic laterites, while the *cerrado sensu stricto* and *cerradão* are associated with dystrophic latosols (IBAMA 2004).

The forested areas located on the northern and northeastern slopes of the ANF were defined as *matas úmidas* associated with dystrophic and eutrophic lithosols (IBAMA 2004), or humid forests. However these areas may be more clearly described as semideciduous seasonal forests, if we take into account the region's climatic characteristics (IBGE 1992). This second type of classification is in accordance with the Vegetation Map of Brazil (IBGE 2004), which records the occurrence of ecotones on the Araripe Plateau, with transitions between savanna-seasonal forests and steppe savanna-seasonal forests.

Data Collection

The floristic survey used the random-walk method (Filgueiras *et al.* 1994) across all the vegetation physiognomies in the ANF, with geo-referenced sample stations (see vegetation map for sample stations sites). The study was carried out on 10 expeditions from October 2007 to December 2008 and comprised both dry and wet seasons. All specimens in reproductive phase were collected and subsequently incorporated into the Dárdano de Andrade-Lima Cariri Regional University Herbarium (HCDAL) in accordance with the usual methodology (Mori *et al.* 1985). Specimen vouchers are shown in Table 1.

Species identification was carried out according to herbarium references (CEN, UB, HEPH, IBGE, HCDAL), specific literature and by consulting experts. The floristic survey followed the Angiosperm Phylogeny Group III (APG III 2009). The Chico Mendes Institute for Biodiversity Conservation-ICMBio provided the research permit (15495/2008).

Results and Discussion

This study surveyed all vegetation physiognomies within the Araripe National Forest - ANF (Figure 3). A total of 188 species from 55 families of angiosperms were recorded (Table 1; see also some species in Figure 4). The most species-rich families were Fabaceae (31), Rubiaceae (17), Asteraceae (14), Bignoniaceae (10), Myrtaceae (9), Euphorbiaceae (7), Apocynaceae and Malpighiaceae (7) and Annonaceae and Solanaceae (5). Together, the other 45 families comprised 76 species.

Among the 188 species recorded within ANF, 124 (65.9%) species also occur in the *Caatinga* biome. This is a expected result since the isolated *cerrado* patches in the state of Ceará are related to climatic changes in the past that have caused expansion and contraction of this dominant vegetation in Central Brazil (Fernandes 1990) and the ANF is surrounded by *Caatinga's* vegetation.

As regards the species richness in the ANF, Costa *et al.* (2004) and Costa and Araújo (2007) reported 59 and 43 species respectively associated with the shrub and the woody layer in the *cerrado*. These results provide richness values lower than in the core area and the isolated *cerrados* in São Paulo (Ratter *et al.* 2003). The isolated and peripheral areas of *cerrados* such as in the state of Paraná and Amazônia also have diversity patterns of woody species lower than in the core area, the peripheral areas of Xingu, Araguaia and Tocantins River basins and the isolated *cerrados* in São Paulo (Ratter *et al.* 2003). The results in Table 1 added 38 new records associated with *cerrado sensu stricto* comprising woody and herbaceous species on the lists of Costa *et al.* (2004) and Costa and Araújo (2007). However, these studies adopted different sampling methods that make it difficult to compare areas, so more sampling efforts are still required on the Araripe Plateau to reach a better understanding of its species richness.

The *cerrados* of ANF presented floristic patterns of the north-northeastern province of the biome in accordance with Ratter *et al.* (2003). The species *Hirtella ciliata* Mart. and Zucc., *Caryocar coriaceum* Wittm., *Parkia platycephala* Benth., *Dimorphandra gardneriana* Tul. and *Platonia insignis* Mart. (Table 1) are restricted to this province

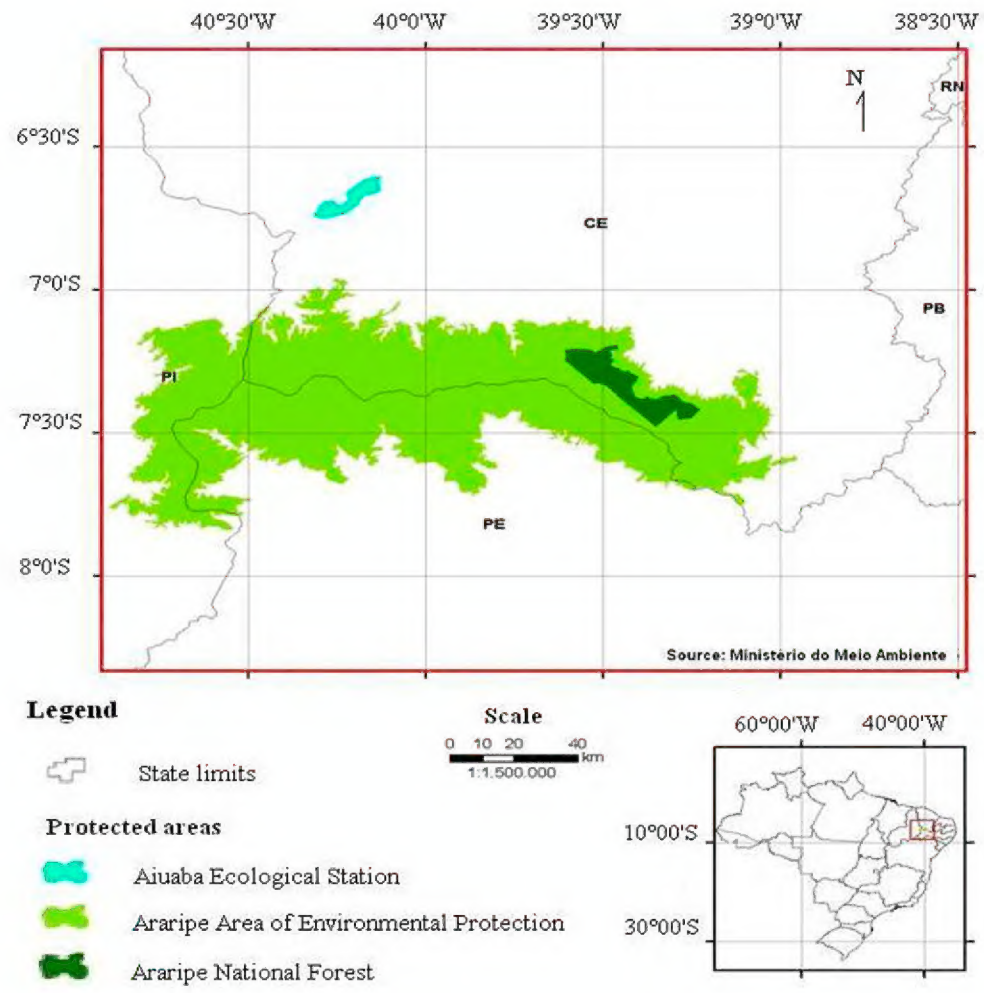

Figure 1. Study area at the Araripe National Forest, Ceará, Brazil. Source: Ministério do Meio Ambiente.

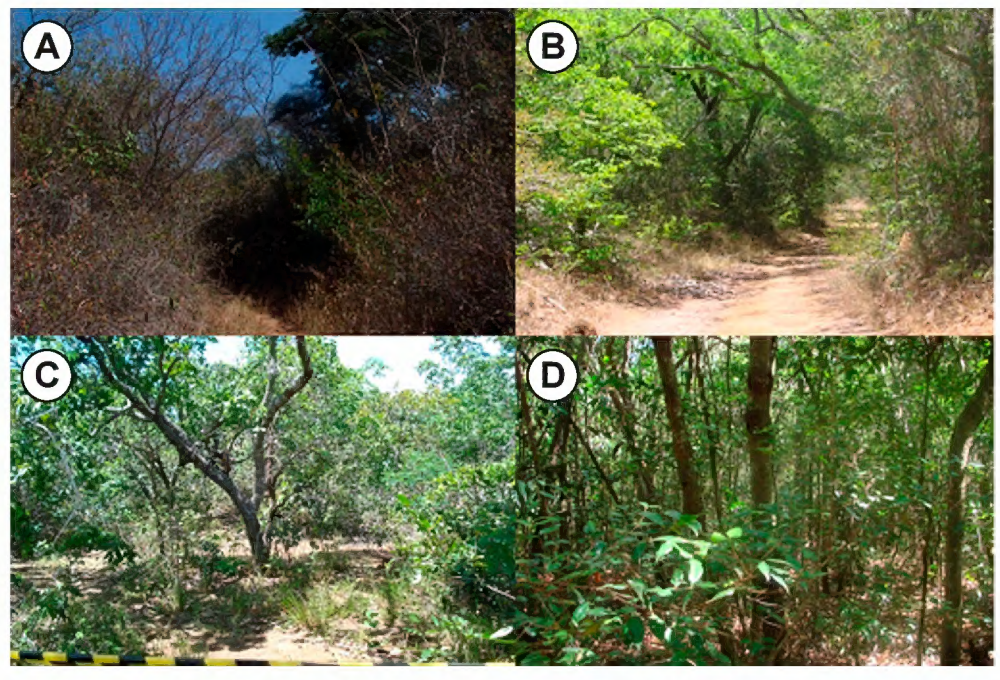

Figure 2. Vegetation physiognomies in the Araripe National Forest, CE, Brazil. A) *Carrasco*; B) *Cerradão*; C) *Cerrado sensu stricto*; D) Semideciduous seasonal forest (Archives of Araripe-PBBI Project).

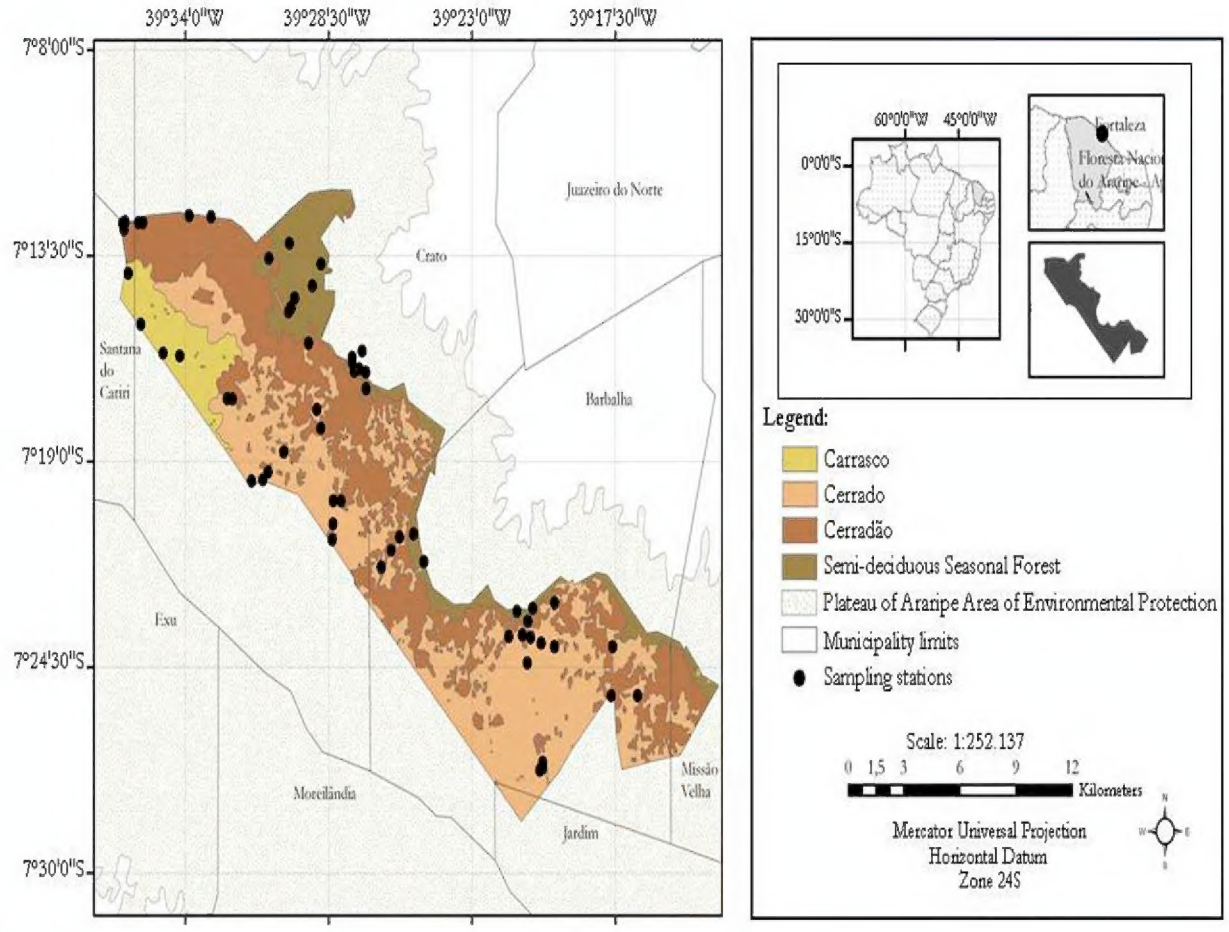

Figure 3. Vegetation map of the Araripe National Forest, CE, Brazil (adapted from IBAMA 2004).

(Ratter *et al*. 2003; Bridgewater *et al*. 2004), and also occur in some coastal *cerrados* (Moro *et al*. 2001). These species were observed in areas of *cerrado sensu stricto* and *cerradão* (Table 1; Costa *et al*. 2004; Costa and Araújo 2007; Alencar *et al.* 2007).

Costa and Araújo (2007) observed that among the species with highest coverage in the ANF, *Byrsonima sericea* DC. and *Qualea parviflora* Mart. are also widespread species in the *Cerrado* biome. *Qualea parviflora* is also considered a widespread species in the peripheral *cerrados* of northeastern Brazil (Castro *et al*. 2007). In addition to these species, the following ones occur both at ANF and are widely distributed in the *Cerrado* biome (Ratter *et al*. 2003): *Anacardium occidentale* L., *Annona coriacea* Mart., *Byrsonima coccolobifolia* Kunth., *Bowdichia virgilioides* Kunth., *Casearia grandiflora* Cambess., *Cybistax antisyphilitica* (Mart.) Mart., *Duguetia furfuracea* (A. St.-Hil) Saff., *Hancornia speciosa* Gomez, *Jacaranda brasiliana* (Lam.) Pers., *Ouratea hexasperma* (A. St.-Hil.) Baill., *Plathymenia reticulata* Benth., *Roupala montana* Aubl., *Simarouba amara* Aubl., *Stryphnodendron rotundifolium* Mart. and *Tabebuia ochracea* (Cham.) Standl..

Species such as *Senegalia langsdorffii* Benth., *Hymenaea eriogyne* Benth. and *Manihot caerulescens* Pohl. were observed in the *carrasco* of the ANF (Table 1). These species were also observed in the *carrascos* of the Ibiapaba Plateau, in the state of Ceará (Araújo *et al*. 1999). The species *S. langsdorffii* was the most abundant and the one with the highest importance value in this area (Araújo *et al*. 1999).

The remnants of the seasonal semideciduous forests located above 700 m in the ANF are defined as the *Montana* (mountain) subtype (IBGE 1992). This vegetation physiognomy comprise species such as *Byrsonima sericea* DC, *Simarouba amara* Aubl., *Hirtella ciliata* Mart. and Zucc., *Hirtella gracilipes* (Hook. F.) Prance, *Vismia guianensis* (Aubl.) Pers., *Xylopia laevigata* R.W.Fr. and *Zanthoxylum gardneri* Engl. at the ANF.

The occurrence of *B. virgilioides* in the *cerradões* of the ANF (Table 1) indicates a more dystrophic *cerradão*, according to the soil type and to the characteristic species defined by Ratter (1971) and Araújo *et al*. (2001). Alencar *et al*. (2007) also noted *B. virgilioides* with high importance value at the *cerradões* of the Araripe Plateau. However, other species observed in this area, such as *Anadenanthera colubrina* (Vell.) Brenan and *Magonia pubescens* A. St. Hil. (Table 1), also indicate mesotrophic *cerradões* (Ratter *et al*. 2006) and could indicate transition to the seasonal semideciduous forests.

As regards the threatened species, there are three that are included on the IUCN list (IUCN 2012) (Table 1): *Caryocar coriaceum* Wittm., *Chrysophyllum arenarium* Allemão and *Lafoensia pacari* A. St.. Besides these threatened species, the *cerrado* remmants of the ANF also harbor species that are targets for harvesting activities associated with non-timber forest products of local and regional trade importance. *Caryocar coriaceum* Wittm. (*piqui*), *Dimorphandra gardneriana* Tul (*faveira*), *Himatanthus drasticus* (Mart.) Plumel (*janaguba*) and *Stryphnodendron polyphyllum* Mart. (*barbatimão*) are some of the species that provide income to the communities resident near ANF (IBAMA 2004).

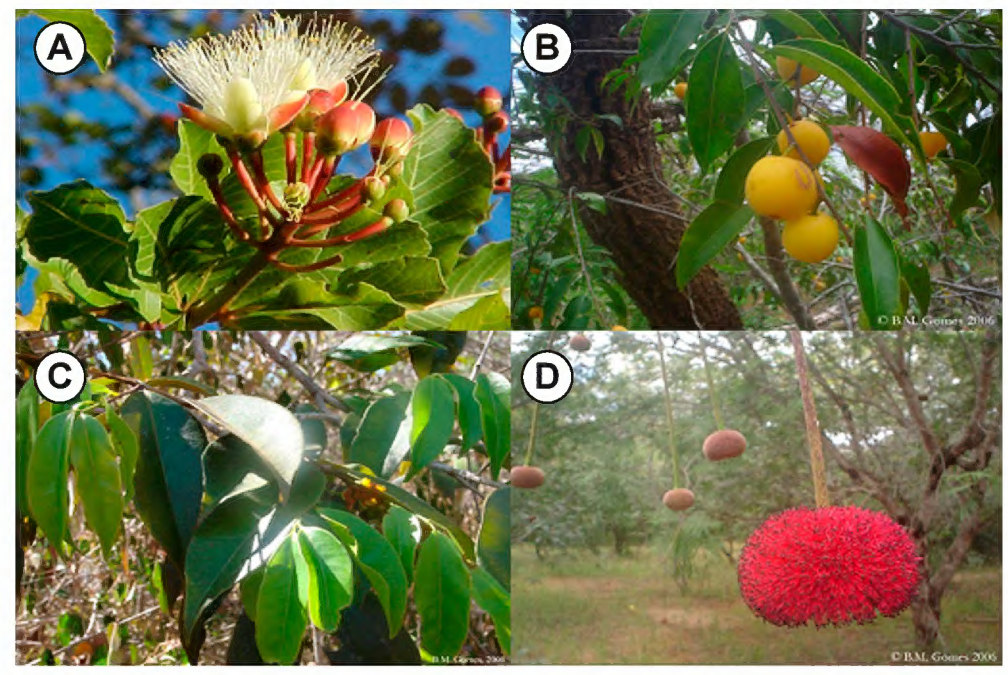

Figure 4. Some species collected in the Araripe National Forest, CE, Brazil. a) *Caryocar coriaceum* Witmm. b) *Chrysophyllum arenarium* Allemão c) *Psidium* sp. new, d) *Parkia platycephala* Benth. (Photographs "a" by Suelma Ribeiro-Silva; Photographs "b and "c" by Beatriz Gomes).

This study differs from the previous surveys (Costa *et al*. 2004; Costa and Araújo 2007) since it provided additional data on the flora of the ANF from all vegetation physiognomies, showing that it harbors representative species of the north-northeastern *Cerrado* province, comprising remnants of *cerrado stricto sensu, cerradão, carrasco* and seasonal semideciduous forests under the influence of the *Caatinga* biome. A number of the recorded species in the ANF also occur in the *Caatinga*, besides the *Cerrado* biome. Furthermore, this study provides the first species records for some vegetation physiognomies in the ANF such as the *carrasco*.

Table 1. Angiosperm species recorded in the Araripe National Forest, Ceará, Brazil. Cerr = *cerrado sensu stricto*; Car = *carrasco*; Cerd = *cerradão*; Fes = semideciduous seasonal forest.

FAMILY/SPECIES	HABIT	PHYSIOGNOMY				VOUCHERS
		Cerr	Car	Cerd	Fes	
ALSTROMERIACEAE						
Alstroemeria piauhyensis Gardner	herb				x	Gomes B.M. 410
ANACARDIACEAE						
Anacardium occidentale L.	tree				x	Silva M.A.P. 1432
ANNONACEAE						
Annona coriacea Mart.	shrub	x				Gomes B.M. 477
Annona leptopetala (R.E.Fr.) H.Rainer	tree			x		Silva M.A.P. s/n
Duguetia fufuracea (A.St.-Hil.) Saff	shrub		x		x	Silva M.A.P. 1483, Silva M.A.P. s/n
Ephedranthus parviflorus S. Moore	tree		X			Seixas E.N.C. s/n
Xylopia laevigata (Mart.) R.E.Fr.	tree	x	X			Seixas E.N.C. s/n, Silva M.A.P. s/n
APOCYNACEAE						
Ditassa capillaris E. Fourn.	vine		x			Seixas E.N.C. s/n
Hancornia speciosa Gomes	tree	x				Alencar A.L. s/n
Himatanthus drasticus (Mart.) Plumel	tree	x				Seixas E.N.C. s/n
Prestonia solanifolia (Müll. Arg.) Woodson	vine		x			Seixas E.N.C. s/n
Secondatia floribunda A. DC.	vine		x			Cartaxo S.L. s/n
Tabernaemontana catharinensis A. DC.	tree		x			Seixas E.N.C. s/n
Temnadenia violacea (Vell.) Miers	vine	x	x			Cartaxo S.L. s/n, Seixas E.N.C. s/n
ASTERACEAE						
Acanthospermum hispidum DC.	herb		x			Gomes B.M. s/n
Achyrocline satureioides (Lam.) DC.	shrub	x				Silva M.A.P. 1440
Ageratum longifolium (Gardner) Benth. ex Baker	shrub	x				Silva M.A.P. 1518, Silva M.A.P. s/n
Ayapana amygdalina (Lam.) R.M. King and H. Rob.	vine	x				Silva M.A.P. 1424
Baccharis trinervis Pers.	herb	x				Seixas E.N.C. s/n, Silva M.A.P. 1507
Calea hymenolepsis Baker	herb	x	x			Seixas E.N.C. s/n, Silva M.A.P. s/n
Dasyphyllum sp.1	shrub	x				Silva M.A.P. 1448
Emilia sonchifolia (L.) DC. ex Wight	herb				x	Seixas E.N.C. s/n
Eremanthus pohlii (Baker) MacLeish	tree				x	Silva M.A.P. 1431
Gochnatia blanchetiana (DC.) Cabrera	tree	x	x			Cartaxo S.L. s/n, Gomes B.M. 414
Lepidaploa remotiflora (Rich.) H. Rob.	subshrub		x			Seixas E.N.C. s/n
Pectis oligocephala (Gardner) Sch.Bip.	herb				x	Seixas E.N.C. s/n
Tilesia baccata (L.f.) Pruski	shrub			x		Silva M.A.P. s/n
Verbesina diversifolia DC.	shrub		x			Gomes B.M. s/n
BIGNONIACEAE						
Anemopaegma laeve DC.	vine		x		x	Seixas E.N.C. s/n, Seixas E.N.C. s/n
Bignonia corymbosa (Vent.) L. G. Lohmann	vine			x		Seixas E.N.C. s/n
Cybistax antisyphilitica (Mart.) Mart.	tree		x			Silva M.A.P. s/n
Fridericia chica (Bonpl.) L.G.Lohmann	vine	x				Silva M.A.P. s/n
Handroanthus ochraceus (Cham.) Mattos	tree	x				Gomes B.M. 474
Handroanthus serratifolius (A.H. Gentry) S. Grose	tree		x			Silva M.A.P. 1488
Jacaranda brasivine (Lam.) Pers.	tree		x			Silva M.A.P. 1499
Lundia cordata (Vell.) DC.	vine		x			Seixas E.N.C. s/n
Pleonotoma stichadenia K. Schum.	vine		x			Gomes B.M. 468, Seixas E.N.C. s/n
Pyrostegia venusta (Ker Gawl.) Miers	vine		x		x	Silva M.A.P. s/n, Gomes B.M. 472
BORAGINACEAE						
Cordia rufescens A. DC.	tree		x			Seixas E.N.C. s/n
Tournefortia membranacea (Gardner) DC.	vine		x			Seixas E.N.C. s/n
Varronia cf. *multispicata* (Cham.) Borhidi	shrub		x			Seixas E.N.C. s/n
Varronia harleyi (Taroda) J.S. Mill.	shrub	x				Silva M.A.P. s/n
BURSERACEAE						
Protium heptaphyllum (Aubl.) Marchand	tree				x	Gomes B.M. 457

Table 1. ***Continued.***

FAMILY/SPECIES	HABIT	PHYSIOGNOMY				VOUCHERS
		Cerr	Car	Cerd	Fes	
CACTACEAE						
Cereus jamacaru DC.	tree		x			Seixas E.N.C. s/n
CARYOCARACEAE						
Caryocar coriaceum Wittm.	tree	x				Gomes B.M. 421, Silva M.A.P. 1410
CELASTRACEAE						
Maytenus cf. *distichophylla* Mart. ex Reissek	tree		x			Seixas E.N.C. s/n
CHRYSOBALANACEAE						
Hirtella ciliata Mart. and Zucc.	tree			x	x	Gomes B.M. 463, Silva M.A.P. 1460
Hirtella gracilipes (Hook. f.) Prance	tree				x	Gomes B.M. 451, Silva M.A.P. 1459
Licania sp.1	tree				x	Silva M.A.P. 1461
COMBRETACEAE						
Buchenavia tetraphylla (Aubl.) R.A. Howard	tree		x	x		Alencar A.L. 99, Figueiredo J.M. s/n
CONNARACEAE						
Connarus detersus Planch.	tree				x	Cartaxo S.L. s/n
CONVOLVULACEAE						
Calycolobus aff. *lanulosus* D.F. Austin	vine		x			Santos A.C.B. s/n
Merremia macrocalyx (Ruiz and Pav.) O'Donell	vine				x	Silva M.A.P. 1429
CYPERACEAE						
Rhynchospora exaltata Kunth	herb	x				Silva M.A.P. s/n
ERYTROXYLACEAE						
Erythroxylum barbatum O.E. Schulz	shrub	x				Gomes B.M. 476, Silva M.A.P. s/n
Erythroxylum deciduum A. St.-Hil.	shrub	x				Silva M.A.P. s/n
Erythroxylum stipulosum Plowman	shrub		x			Silva M.A.P. 4303
EUPHORBIACEAE						
Astraea lobata (L.) Klotzsch	herb				x	Oliveira I.G. s/n
Croton glandulosus L.	shrub	x	x			Silva M.A.P. s/n, Silva M.A.P. s/n
Croton sp.1	subshrub				x	Silva M.A.P. 1517
Manihot caerulescens Pohl	shrub	x				Silva M.A.P. s/n, Silva M.A.P. 1464
Maprounea guianensis Aubl.	tree			x		Alencar A.L. 97
Microstachys daphnoides (Mart.) Müll. Arg.	shrub	x	x			Santos A.C.B. s/n, Silva M.A.P. s/n
not identified	subshrub	x				Silva M.A.P. 1458
FABACEAE						
Anadenanthera colubrina (Vell.) Brenan	tree				x	Silva M.A.P. 1498
Bionia pedicellata (Benth.) L.P.Queiroz	shrub	x				Silva M.A.P. 1433, Silva M.A.P. 1449
Bowdichia virgilioides Kunth.	tree	x			x	Silva M.A.P. 1469
Calliandra depauperata Benth.	shrub		x			Sousa J.R. 36
Centrosema arenarium Benth.	vine				x	Silva M.A.P. s/n
Chamaecrista flexuosa (L.) Greene	herb		x			Silva M.A.P. 1481
Chamaecrista ramosa var. *mollissima* (Benth.) H.S. Irwin and Barneby	subshrub			x		Gomes B.M. 460
Clitoria sp.1	subshrub	x			x	Silva M.A.P. 1475
Copaifera langsdorffii Desf.	tree	x	x			Cartaxo S.L. s/n, Silva M.A.P. s/n
Crotalaria aff. *goreensis* Guill. et Perro	subshrub				x	Silva M.A.P. s/n
Dalbergia miscolobium Benth.	tree		x			Gomes B.M. 470
Dimorphandra gardneriana Tul.	tree		x			Seixas E.N.C. s/n
Dioclea grandiflora Benth.	vine				x	Silva M.A.P. s/n
Hymenaea eriogyne Benth.	tree		x		x	Seixas E.N.C. s/n, Seixas E.N.C. s/n
Leptolobium dasycarpum Vogel	tree		x			Silva M.A.P. s/n
Lonchocarpus sp.1	tree	x				Cartaxo S.L. 5, Ferreira W.N. 9
Parkia platycephala Mart.	tree			x		Gomes B.M. 412, Silva M.A.P. 1401
Periandra mediterranea (Vell.) Taub.	subshrub				x	Silva M.A.P. 1446
Plathymenia reticulata Benth.	tree		x	x		Cartaxo S.L. s/n, Gomes B.M. 464
Rhynchosia minima (L.) DC.	vine		x			Oliveira J.G. s/n
Senegalia langsdorffii (Benth.) Seigler and Ebinger	tree		x			Silva M.A.P. s/n
Senegalia riparia (Kunth) Brith and Rose	tree		x			Silva M.A.P. 2633
Senna rugosa (G. Don) H.S. Irwin and Barneby	shrub	x			x	Silva M.A.P. 1503
Senna splendida (Vogel) H.S. Irwin and Barneby	shrub	x			x	Silva M.A.P. 1479
Senna trachypus (Benth.) H.S. Irwin and Barneby	shrub	x				Seixas E.N.C. s/n

Table 1. ***Continued.***

FAMILY/SPECIES	HABIT	PHYSIOGNOMY				VOUCHERS
		Cerr	Car	Cerd	Fes	
Senna velutina (Vogel) H.S. Irwin and Barneby	shrub	x	x			Silva M.A.P. s/n, Seixas E.N.C. s/n
Stryphnodendron polyphyllum Mart.	tree	x				Souza A.J.S. 5744
Stryphnodendron rotundifolium Mart.	tree	x				Silva M.A.P. 1501
Stylosanthes capitata Vogel	herb				x	Silva M.A.P. s/n
Stylosanthes guianensis (Aubl.) Sw.	subshrub	x				Silva M.A.P. 1404
Swartzia flaemingii Raddi	shrub	x				Alencar A.L. s/n
HYPERICACEAE						
Vismia guianensis (Aubl.) Choisy	tree				x	Silva M.A.P. 1454
KRAMERIACEAE						
Krameria cf. *argentea* Mart. ex Spreng.	herb		x			Silva M.A.P. s/n
LAMIACEAE						
Aegiphila lhotskiana Cham.	tree				x	Silva M.A.P. s/n
Hyptis ampelophylla Epling	herb	x				Gomes B.M. s/n
Hyptis desertorum Pohl ex Benth.	herb				x	Silva M.A.P. 1425
Vitex flavens Kunth	shrub	x				Silva M.A.P. 1505
LAURACEAE						
Cassytha filiformis L.	epiphytic	x				Gomes B.M. s/n
not identified 1	tree	x				Seixas E.N.C. s/n
not identified 2	tree				x	Seixas E.N.C. s/n
not identified 3	tree			x		Silva M.A.P. 1400
LOGANIACEAE						
Strychnos gardneri A. DC.	tree		x			Gomes B.M. 469, Silva M.A.P. 1528
LORANTHACEAE						
Struthanthus cf. *flexicaulis* Mart.	epiphytic	x				Cartaxo S.L. s/n
LYGODIACEAE						
Lygodium venustum Sw.	vine				x	Silva M.A.P. 1508
LYTHRACEAE						
Lafoensia pacari A. St.-Hil.	tree			x		Silva M.A.P. 1415
MALPIGHIACEAE						
Banisteriopsis stellaris (Griseb.) B. Gates	subshrub	x				Gomes B.M. 403, Silva M.A.P. 1482
Banisteriopsis variabilis B. Gates	vine		x			Gomes B.M. s/n, Seixas E.N.C. s/n
Byrsonima coccolobifolia Kunth	tree	x	x			Seixas E.N.C. s/n
Byrsonima pachyphylla A.Juss.	tree			x		Gomes B.M. 422, Silva M.A.P. 1526
Byrsonima sericea DC.	tree	x	x			Seixas E.N.C. s/n, Seixas E.N.C. s/n
Stigmaphyllon paralias A. Juss.	herb				x	Silva M.A.P. s/n
MALVACEAE						
Pavonia aff. *viscosa* A. St.-Hil.	vine		x			Oliveira, I.G. s/n
Pavonia malacophylla (Link and Otto) Garcke	subshrub	x				Gomes B.M. 406
Triumfetta semitriloba Jacq.	subshrub				x	Silva M.A.P. s/n
MELASTOMATACEAE						
Miconia albicans (Sw.) Triana	shrub	x				Silva M.A.P. s/n
Miconia ligustroides (DC.) Naudin	shrub				x	Gomes B.M. 453
MYRTACEAE						
Eugenia punicifolia (Kunth) DC.	tree	x				Gomes B.M. 480, Silva M.A.P. 1406
Myrcia guianensis (Aubl.) DC.	tree		x		x	Cartaxo S.L. s/n, Seixas E.N.C. s/n
Myrcia splendens (Sw.) DC.	tree			x	x	Alencar A.L. 100, Cartaxo S.L. s/n
Myrcia tomentosa (Aubl.) DC.	tree		x			Cartaxo S.L. s/n
Myrciaria cf. *strigipes* O. Berg.	tree				x	Figueiredo J.M. s/n
Psidium myrsinites DC.	tree	x				Gomes B.M. 479
Psidium salutare var. *pohlianum* (O. Berg) Landrum	tree	x				Gomes B.M. 478
Psidium sp. new. ind.	tree		x			Gomes B.M. 465, Seixas E.N.C. s/n
NYCTAGINACEAE						
Guapira graciliflora (Mart. ex Schmidt) Lundell	tree	x				Silva M.A.P. s/n
OCHNACEAE						
Ouratea hexasperma (A. St.-Hil.) Baill.	tree	x				Cartaxo S.L. s/n
Ouratea spectabilis (Mart.) Engl.	shrub				x	Alencar A.L. 88, Gomes B.M. 458
OLACACEAE						
Ximenia americana L.	tree	x	x			Gomes B.M. 467, Silva M.A.P. s/n

Table 1. ***Continued.***

FAMILY/SPECIES	HABIT	PHYSIOGNOMY				VOUCHERS
		Cerr	Car	Cerd	Fes	
ORCHIDACEAE						
Catasetum sp.1	epiphytic			x		Gomes B.M. 462
OXALIDACEAE						
Oxalis frutescens L.	herb				x	Silva M.A.P. 1478
PASSIFLORACEAE						
Passiflora cincinnata Mast.	vine		x			Gomes B.M.
Passiflora silvestris Vell.	vine		x			Seixas E.N.C. s/n
POLYGALACEAE						
Bredemeyera brevifolia (Benth.) Klotzsch ex A.W. Benn.	vine		x	x		Silva M.A.P. 1414, Seixas E.N.C. s/n
Securidaca diversifolia (L.) S.F. Blake	vine				x	Silva M.A.P. 1506
POACEAE						
Aristida longifolia Trind	herb	x				Costa I.R 294
Eragrostis maypurensis (Kunth) Steud	herb	x				Costa I.R 38
Gymnospogon poliiasy (Willd) F.Voes	herb	x				Costa I. R 32
Trachypogon spicatus (L.f) Kuntze	herb	x				Costa I. R. 25
PRIMULACEAE						
Cybianthus detergens Mart.	tree	x			x	Silva M.A.P. s/n, Cartaxo S.L. s/n
PROTEACEAE						
Roupala montana Aubl.	shrub		x			Silva M.A.P. 1533
RHAMNACEAE						
Ziziphus joazeiro Mart.	tree	x				Silva M.A.P. s/n
RUBIACEAE						
Borreria brownii (Rusby) Standl.	herb				x	Silva M.A.P. s/n
Borreria densiflora DC.	herb				x	Silva M.A.P. s/n
Borreria verticillata (L.) G. Mey	herb				x	Morais A.C.A. 166
Chiococca alba (L.) Hitchc.	shrub				x	Alencar A.L. 80
Coccocypselum lanceolatum (Ruiz and Pav.) Pers.	herb				x	Alencar A.L. 70
Cordiera myrciifolia (K. Schum.) C.H. Perss. and Delprete	shrub			x	x	Gomes B.M. 423, Silva M.A.P. 1422
Cordiera rigida (K. Schum.) Kuntze	shrub		x			Seixas E.N.C. s/n
Coussarea hydrangeifolia (Benth.) Müll. Arg.	tree				x	Silva M.A.P. 1419
Declieuxia fruticosa (Willd. ex Roem. and Schult.) Kuntze	herb	x				Morais A.C.A. 43
Diodella apiculata (Willd. ex Roem. and Schult.) Delprete	herb	x				Morais A.C.A. 60
Faramea nitida Benth.	shrub			x		Alencar A.L. 64
Guettarda virbunoides Cham. and Schltdl.	shrub			x		Silva M.A.P. s/n
Psychotria carthagenensis Jacq.	shrub				x	Andrade A.O. 01
Psychotria colorata (Willd. ex Schult.) Müll. Arg.	subshrub				x	Morais A.C.A. 196
Psychotria hoffmannseggiana (Willd. ex Schult.) Müll.Arg.	subshrub				x	Seixas E.N.C. s/n
Sabicea cinerea Aubl.	vine				x	Santos M.A.F. s/n
Tocoyena formosa (Cham. and Schltdl.) K.Schum.	tree	x				Silva M.A.P. 1408
RUTACEAE						
Zanthoxylum gardneri Engl.	tree		x	x		Alencar A.L. 85, Seixas E.N.C. s/n
SALICACEAE						
Casearia aff. *rufescens* Cambess.	Tree		x			Figueiredo J.M. s/n, Seixas E.N.C. s/n
Casearia grandiflora Cambess.	tree	x			x	Silva M.A.P. 1425, Silva M.A.P. 146
Casearia javitensis Kunth	tree			x	x	Alencar A.L. 86, Gomes B.M. 455
SANTALACEAE						
Phoradendron crassifolium (Pohl ex DC.) Eichler	epiphytic			x		Gomes B.M. 459
Phoradendron mucronatum (DC.) Krug and Urb.	epiphytic		x			Seixas E.N.C. s/n
SAPINDACEAE						
Matayba guianensis Aubl.	tree		x	x		Alencar A.L. 91, Cartaxo S.L. s/n
Magonia pubescens A. St.-Hil.	tree	x				Silva M.A.P. 1522
Serjania lethalis A. St.-Hil.	vine				x	Silva M.A.P. 1468, Silva M.A.P. s/n
SAPOTACEAE						
Chrysophyllum arenarium Allemão	tree			x	x	Gomes B.M. 415, Silva M.A.P. 1530, Luz L.N. s/n
SIMAROUBACEAE						
Simaba sp.	shrub		x			Seixas E.N.C. s/n
Simarouba amara Aubl.	tree	x	x			Cartaxo S.L. s/n, Gomes B.M. 475

Table 1. ***Continued.***

FAMILY/SPECIES	HABIT	PHYSIOGNOMY				VOUCHERS
		Cerr	Car	Cerd	Fes	
SOLANACEAE						
Solanum sp.1	shrub	x				Silva M.A.P. s/n
Solanum decompositifolium Sendtn.	herb	x				Silva M.A.P. s/n
Solanum paniculatum L.	shrub				x	Silva M.A.P. 1486
Solanum rhytidoandrum Sendtn.	shrub	x			x	Seixas E.N.C. s/n, Silva M.A.P. 1418
Solanum stipulaceum Willd. ex Roem. and Schult.	subshrub				x	Silva M.A.P. 1519
STYRACACEAE						
Styrax camporum Pohl	tree	x			x	Silva M.A.P. s/n
TURNERACEAE						
Turnera diffusa Willd. ex Schult.	shrub	x				Cartaxo S.L. s/n
Turnera melochioides Cambess.	shrub	x			x	Silva M.A.P. 1427
VERBENACEAE						
Lantana camara L.	shrub		x		x	Seixas E.N.C. s/n, Oliveira J.G. s/n
Lantana fucata Lindl.	herb				x	Silva M.A.P. s/n
Lippia cf. *microphylla* Cham.	shrub		x			Seixas E.N.C. s/n
Stachytarpheta polyura Schauer	herb		x	x		Silva M.A.P. 1421
VITACEAE						
Cissus erosa Rich.	vine	x			x	Silva M.A.P. s/n, Seixas E.N.C. s/n
VOCHYSIACEAE						
Qualea parviflora Mart.	tree	x	x			Silva M.A.P. s/n, Silva M.A.P. s/n

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